

VIDEO INTERVIEW TRANSCRIPT

## Miner, Wesley: transcript of a video interview (15-Jul-2016)

**Interviewer:** Tilli Tansey

**Transcriber:** Debra Gee

**Editors:** Tilli Tansey, Adam Wilkinson

**Date of publication:** 14-Oct-2016

**Date and place of interview:** 15-Jul-2016; Queen Mary University of London

**Publisher:** Queen Mary University of London

**Collection:** History of Modern Biomedicine Interviews (Digital Collection)

**Reference:** e2016095

**Number of pages:** 9

**DOI:** 10.17636/01015868

**Acknowledgments:** The technical support (filming and production) of Mr Alan Yabsley is gratefully acknowledged. The History of Modern Biomedicine Research Group is funded by the Wellcome Trust, which is a registered charity (no. 210183). The current interview has been funded by the Wellcome Trust Strategic Award entitled “Makers of modern biomedicine: testimonies and legacy” (2012-2017; awarded to Professor Tilli Tansey).

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**Citation:** Tansey E M (intvr); Tansey E M, Wilkinson A (eds) (2016) *Miner, Wesley: transcript of a video interview (15-Jul-2016)*. History of Modern Biomedicine Interviews (Digital Collection), item e2016095. London: Queen Mary University of London.

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## Miner, Wesley: transcript of a video interview (15-Jul-2016)\*

**Biography:** Mr Wesley Miner BSc (b. 1948) is a graduate in physiology from the University of Edinburgh. From 1982 to 1986 he worked at Beecham Pharmaceuticals (GlaxoSmithKline since 2000) with Gareth Sanger. During this time, Miner and Sanger discovered, and were the first to publish that serotonin receptor type 3 (5-HT<sub>3</sub>) antagonists were extremely efficacious pharmacological agents for preventing and treating anti-cancer therapy (chemo and radiation) induced nausea and vomiting (Miner and Sanger, 1986). This seminal experimental work translated very well to the clinic when granisetron (Kytril) was shown to be highly efficacious in patients. Importantly, this discovery became one of a very select few where research into 5-HT mechanisms actually culminated in a marketable drug that markedly improved the quality of life for patients. Following this ground-breaking research at Beecham, he relocated to another major international pharmaceutical company and became a key member of the biology team that discovered darifenacin (M<sub>3</sub> selective antimuscarinic), which is now indicated and marketed for over active bladder and urinary incontinence.

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### [1]. THE ALL ABOUT BOOKS AND BEING LEFT A LOT OF MONEY

Well, I always have had an interest in science, as I imagine many of us have, since I've been quite young. Essentially I started with reading books about science and kinda progressed from there. Certainly I was never a real star pupil in any way, shape or form in high school, although I maintained my interest in science there. One of the things that actually did my interest in science was probably when I was about seven or eight-years-old and one of my aunts gave me for a birthday present, she gave me this token to get me into a book club. And so I started receiving books from the book club and in fact there was a series of books and they were called *All About* books, and the first book that I ever read was *All About Dinosaurs*. And I didn't actually even have an interest in dinosaurs at the time but I was fascinated that you could actually have this collection of knowledge in books. It just kinda opened up for me. Oh you know! And then after that there were a couple of more books, there was *All About the Atom* which I thought was quite fascinating and then *All About the Solar System*. So that's really probably where the real start of my interest started out and it just kinda moved on from there, and retained my interest in science, but I was not you know exceptionally good at studying, shall we say, in high school. In fact, I would be pretty bad really. I was a very average student but I always retained my interest in science from that point on. And then from there it just did develop.

Well, after I'd gotten out of high school I was in a situation for a number of years where I was just kinda floating around not doing too much, still had an interest in science but wasn't really pursuing it. But what I did have was I actually had quite a sizeable estate left to me by my parents, which as I explained earlier, probably would equate to about \$700,000 (US) or \$800,000 in today's money. And because I wasn't exactly ambitious and in fact I was downright lazy and I knew that this estate was coming on board when I was 21-years-old, I really just kinda drifted. And then when I hit 21 I was lucky enough to come into the money. So I had all this money, was very work shy, and not really interested in working, and effectively of the \$800,000 I had I spent 95% of it on fast cars, fast women, booze and wild parties.

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\* Interview conducted by Professor Tilli Tansey, for the History of Modern Biomedicine Research Group, 15 July 2016, in the School of History, Queen Mary University of London. Transcribed by Mrs Debra Gee, and edited by Professor Tilli Tansey and Mr Adam Wilkinson.

**[2]. RUNNING OUT OF MONEY AND A TRIP TO EUROPE**

But what happened was that okay, I ended up spending this money and I remember really actually kinda looking at my bank account one day and realizing I only had about \$10,000 left in the account, and I knew I could get through that very quickly in fact. And so I had a real good think about things and I thought, 'Well, if I stay in the United States, I'm going to spend this money, the last of the money I have actually quite quickly.' And so it dawned on me that if somehow I made it over to Europe I could sort of spin this money out maybe for another two or three years before I actually had to go to work and support myself. So that's pretty much what I did. I actually just went to the travel agency, first of all I bought myself a real good sleeping bag and a real good backpack and all that, and went to the travel agency and I got a one-way ticket for Munich. And I ended up flying into Munich in Germany. Of course you have to consider what, you know, my background was at the time. I was from the United States, I'd never really been out of the country and I'd been brainwashed by everything I'd seen in Hollywood. And so when I got off the airplane in Munich I just naturally assumed everybody spoke English. And suddenly it dawned on me these people were talking to me in German. Why were they talking in German? You know, just because it was Germany. That one sort of threw me back a bit. But it probably does exemplify how naïve I was at the time with, you know, doing things.

But from Munich I decided that in fact I would travel around Germany a bit and then head down towards Austria, Italy, around Genoa and then ended up staying just about Marseille in France for two or three months with a friend who was down there, actually had come over earlier than I had. Had a really good time. And then from there went on and kinda went north for no other reason than you know it was just something to do, and ended up in England. And then got into England and I arrived actually, I arrived at night, I got the ferry over from France and I arrived, I think it was in Southampton and I ended up driving through the night, I ended up driving through London and by this time I was actually starting to get kinda tired. And I got through London and I must have gotten up onto the north coast of England somewhere and I was looking for a hotel at the time, and I kept going past all these hotels and all the hotels had little signs in the front that said, 'Residents Only.' And I thought, 'Gee, I'm not a resident here, I can't stay in these hotels.' It just didn't dawn on me what that kinda meant by 'Residents Only.'

Ultimately I did find a motel to stay in which again I think was up by Grimsby. By this point I'd gotten that far north and stayed in the hotel and oddly enough it was at that point that suddenly I had this kinda revelation that I wanted to go in to study something in medical sciences. You know I wasn't sure exactly the course, I thought certainly neuroscience was very interesting, although I didn't have a lot of background in it. It was just something that hit me that that's what I want to do. So there I am kinda out of high school, no qualifications at all other than a high school diploma, running out of money rapidly and wondering just kinda how I'm going to do this.

**[3]. GOING BACK TO SCHOOL AND THEN TO UNIVERSITY**

Well, what I had decided was that I did want to go into medical sciences and that in order to do that I was going to really have to go to university and get into the universities. Now because I just had a straight high school education, and education over here was actually quite advanced of the same level of American education, what I found after actually being fortunate enough to talk with some of the people at the universities, what I found out was I was going to have to go back and effectively go back to school and do, and pick up my O grades and higher grades. This was up in Scotland. So that's what I did. For three years I got myself a job working nights so that I could actually go to school during the day and get my O grades and higher grades in biology, chemistry, mathematics and physics. And at the time because I was 25 that was enough, for the universities to accept me as a mature student. And I did work hard at it, I got all As in all my classes, but I was running out of money real fast and needed to eat, and support a family. By this point I had a son and a daughter.

Yeah, so I did apply to the University of Edinburgh, that was my first choice, to get into biological sciences and then physiology. What I found out - and was so pleased to find out - was that because I'd gone back

and done my O grades and my higher grades, and it had taken me three years, over that three-year period I had been considered a permanent resident of the country. And because I was a permanent resident of the country, the government paid for my entire education, gave me a grant completely and also you know something to live off, again a wife and two children. We didn't live high but you know it was enough to survive on. It was very, very good. A very nice system. Perfect system.

Yes, so I was accepted to University of Edinburgh and at the time it was biological sciences. And the whole idea in Scottish universities is that you study for three years in biological sciences as my chosen subject, and at the end of three years you obtain an ordinary BSc degree. Then if you've done well enough and you have certain specialist subjects that you take during those three years, which in my instance was pharmacology, physiology and biochemistry, then you're able to actually apply to go into an honours year. And I was lucky enough to be accepted into honours physiology. There were only nine of us that actually did get into it, and we had to go for an interview with the Professor of the Department who was Bill Watson at the time, and John Russell was the second Head of the Department. But it was an area that I really wanted to get into and I you know kinda pushed them I think and made my case for, yes, this is something I really do want to do.

So I was fortunate enough to do reasonably well in Edinburgh and graduated with the honours degree in physiology and from there obviously put out a number of applications to various companies. In fact, I applied for anything I could possibly do: British Rail, accountancy, anything, but was lucky enough to get into a contract research company that was involved in pharmaceutical research. And from there, I was there for about two years and it did allow me to develop further skills actually in my background, which is pretty much *in vivo* pharmacology. Now this was something I didn't mention earlier but when I was at Edinburgh University we were very lucky because our honours year in physiology dealt almost wholly with *in vivo* work, and this gave me a background that I just don't think a lot of other people had at that time. And I'm sure they don't now. But then I did get into contract research with this company and it kinda played to my strengths. I was involved in quite a bit of *in vivo* research there and this would pay off later on because it did help me develop skills in actually surgery and recovery surgery, which played a big part in work ultimately when I went onto do anti-emetic work later on.

#### [4]. PHARMACOLOGICAL RESEARCH AT BEECHAMS

Right. So I was working in contract research but did hit a point where it struck me that what I really wanted to do was get into mainstream pharmaceutical research with a big pharma company. And at that point I actually applied to work at Beechams and got the interview and did get a job. And as I came into Beechams my remit really was pretty much all *in vivo* work, in fact it was wholly *in vivo* work, and again this is where I had my expertise. And the company gave me quite a bit of leeway. We started out developing models of gastric motility and looking at gastric emptying in dogs and importantly at that time Beecham gastro-motility project was very much focused on a compound called metoclopramide. And this is something that Gareth Sanger was brought in look at initially and to figure out how it was actually working because it was known to stimulate gastrointestinal motility. And my initial work actually did that but then it branched out from there, working with another man who was our project leader, David Turner, it was decided that we would start looking at anti-emetic work. And this was actually based on metoclopramide because metoclopramide was known to be an anti-emetic at the time and in fact the people over in Bristol-Myers [Bristol-Myers Squibb], John Schurig, had investigated models in the ferret because Bristol-Myers actually had a compound at the time called "cisplatin". Now cisplatin is used in cancer chemotherapy. It's a very effective compound but if you get cisplatin to treat the cancer that you have you will vomit and have nausea for roughly five to seven days. It's a horrendous problem and it's not just a little bit of nausea and vomiting, you're vomiting all the time and nauseated all the time. That was the problem we were sort of confronted with.

#### [5]. NAUSEA AND VOMITING - THE FERRET MODEL

Because of the expertise I had on the *in vivo* side it was decided that I would actually take on developing the ferret model to look at how cisplatin induced emesis in the animals. And I will say at this point that although there is so much controversy, *controversy* over here, sorry, in use of animal models that there is absolutely no

way this work could have gone forward without the animal models. And the importance of it is that the compounds that were ultimately found and developed were very, very effective and have helped a lot of people. But it could not have happened without animal models. And everything was regulated very heavily back then by the Home Office, and still is with the use of animal models. But that's how we got started into it, looking at the cisplatin in the ferret model and then from there we moved forward.

So we were pretty much given the task of developing emesis models in the ferret and again this is one of the real advantages that we had because we were able to take the ferret and produce a model that very closely mimicked the clinical situation. This is something that does not happen often you know in pharmacological research. It's not an easy thing to do but we were quite lucky with that. And the first thing we did was look at cisplatin, and again the cisplatin had horrendous side effects in humans. And we got into that and we looked at metoclopramide and metoclopramide worked. And we knew it probably would. We looked at another compound, renzapride and it had also worked. We looked at further compounds which were called "dopamine antagonists", which were being very much pushed at the time in humans to treat the nausea and vomiting but were not probably very effective and they didn't work at all in the ferret. In fact, they made things worse if anything. So we were sitting there with a situation where we had metoclopramide worked, renzapride worked, against cisplatin. Additionally, at that point we decided, well we'd also better start looking at some other emetic stimuli. And I developed the model which took cyclophosphamide and doxorubicin together, which again are very potent anti-cancer compounds, and used that to produce emesis in the ferret when dosed together. And the emetic response was quite profound and very similar to the cisplatin.

And then we developed a third model which was the radiation model where we also looked at irradiating the animals and producing emesis, and the response was that. Now right about that time working with Gareth Sanger, Gareth started becoming very interested in this work. He had been working on metoclopramide and given the remit effectively to understand how metoclopramide worked because we were looking for gastric motility stimulants. Well Gareth knew metoclopramide pretty well, he'd made some pretty profound discoveries. He kinda looked at our work that we were doing, he wasn't directly involved right in the thing at the time, but he was looking at the work and Gareth looked and he saw that metoclopramide worked in the models against the cisplatin-induced vomiting. It worked pretty good. He saw that renzapride worked, not bad, not quite as good as metoclopramide, and he saw that domperidone and the dopamine antagonist didn't work. And at that point, it's called a "Eureka moment" I'm sure, you know, and it's down to Gareth. He made this quantum leap, absolute quantum leap, and put it all together and said, 'Look, the anti-emetic effects of these compounds are coming from 5-HT<sub>3</sub> M-receptor antagonism.'

So Gareth just quantum leap, absolute quantum leap, made this connection and said, 'Look, it's a 5-HT<sub>3</sub> M-receptor [now 5-HT<sub>3</sub>] antagonism, this is where the anti-emetic activity of these compounds is coming.' And nobody had ever come up with that before. So he, Gareth actually knew John Fozard very well, who was working with Marion Merrell Dow at the time. And Marion Merrell Dow had a compound, MDL 72222. And Gareth got in touch with John Fozard, and just asked John, 'Could you give us some of this compound?' It was a pure 5-HT<sub>3</sub> M-receptor, 5-HT<sub>3</sub> receptor, antagonist, didn't have any other activities at all. If John had not given us the compound we could have spent months and months making our own compound and that would have just set everything back. But you know it was really nice back then, back in the old days, people kinda worked together even from different companies. So John sent us up the compound, Gareth got a hold of it and he gave it to me and previously I had set up the ferrets, we had them all set, I think we had four animals getting ready to be tested. And I took the compound and I think I mentioned it before but the thing is, if you give a ferret cisplatin as with people there's no question, they will vomit, 100%. Just no question about it. And I took the compound, the MDL 72222 and gave it to the ferrets and they just, it was like they never even got the cisplatin. It was just a complete response; it was quite amazing. And they wouldn't let me work in the main animal house because nobody liked ferrets, right? They're kinda smelly little beasts. They're not really but they're kinda smelly little beasts. So they used to make me work in this little back lab and I was back there on my own and I'd done the experiments and coming up to the end of the observation period and I still remember to this day Gareth coming around to this little back lab, you know, and I think it was a rainy little night or something, kinda poking his head

around the door and looking at me going, 'Did it work?' 'Yeah, it worked, Gareth.' I said, 'Yeah, it really worked, it really did work well.' And that was, you know, everything moved forward from that quite quickly.

#### [6]. NAUSEA AND VOMITING - PROBLEMS WITH MANAGEMENT

It was an interesting time with, at Beechams, because Beechams had previously been involved in anti-emetic work. And they had got involved I think pretty much with the cannabinoids, which produced some pretty bad side effects. And because of that, we were actually pretty much told, 'Look, we're never going to do anti-emetic work again.' Senior research management did not want to go into anti-emetics again. But also by that time Gareth and I had started to really accumulate a fair amount of data on these compounds and we knew that they were very good, you know. There was nothing in the clinic that could compare with them. And from that point on we just got the data. And we did have a meeting at one time with senior management where we were all sitting in a project meeting and we were, I got up, started presenting the data and there was 'Yes, here's where it is, here's the ones that didn't get it, here's the ones that did. They vomited, these didn't vomit at all.' And the second-in-command of Research sat there and he looked at me and he said, 'We will never go into anti-emetic research again!' He was really quite forceful about it. 'We're not going into anti-emetic work. We're just not going to do it.' And I just wouldn't shut up. I just couldn't help myself. And I actually ended up sort of just pointing to him and saying, 'Look! If your kids were getting cisplatin, would you refuse them getting this compound?' And you know, I just kept putting up the data and Gareth and I kept on about it and it was at that point we came out of the meeting and one of my colleagues, Christine McClelland turned to me and she said, 'I thought you were going to get fired on the spot right there.' Just because I wouldn't shut up, you know. But we knew we had something and we really wanted to go forward with it on that.

#### [7]. DRUG DISCOVERY AND THE PHARMACEUTICAL INDUSTRY

Certainly there have been quite dramatic changes in drug discovery in the pharmaceutical industry. It was very much an idea of chemistry-led approaches back 20, 30 years ago where you started out with a lead compound and moved it through the, you know, process of development. The problem with that was that it did not allow for a lot of exploratory research. It meant that you had to go to the academics to do the exploratory research. Now this is something that was kinda interesting with the 5-HT<sub>3</sub> stuff, because that was pretty much industry-led at that time. But most of the projects that were moving along at that time were along the chemistry-led idea, starting out with a good lead compound in an area where you have some level of confidence that you may show efficacy, move it up to a very selective and specific compound that is quite potent. The problem with that again is that it just does not allow the exploratory work to be done and what you really have to do, and what I've maintained for quite a number of years, is that in order to get something that has, come up with something that's good, you have to understand the normal physiology first. If you don't understand the normal physiology pretty completely, how can you ever hope to understand where the pathophysiology is coming from?

But because the industry at the time was very keen to fill the pipelines and to keep the shareholders happy, you had to be able to say, 'Our pipeline is constantly being filled. We're constantly bringing this whole new concept idea up and moving.' What happened through a number of pharmaceutical companies was you started getting huge attrition, of compounds failing, and it isn't only that the compounds were failing; it's where they were failing. Now you do your Phase 1 studies, you get an idea of what's going on in humans. You do Phase 2 studies and you start getting efficacy. Then you move into Phase 3 studies which will carry on and increase your patient numbers. What happened probably in the late '90s, certainly 2000, was that you were getting compounds progressed up to Phase 3 and 60% of the Phase 3 compounds were failing. That's very expensive and no-one can keep up that amount. So the whole business model was going to have to change. It had to change. And that's probably the biggest thing that's happening now. You've seen mergers of the large companies because they've got to get their money together anyway. And additionally even the larger companies, they're not doing their own research, as far as I understand, anymore, it's tending to be contracted out. So you're getting smaller companies coming up with ideas, moving those ideas forward

until it looks like, yeah, this is a pretty way to go forward, taking kinda the initial risks and then this moving into the big pharma companies where they would take it on.

How successful that will be, I don't know, because these things are just getting harder and harder to do. But more than anything else, you know, anybody getting into this area now, I think it's absolutely essential for them that they get a terrific understanding of what's going on normally in physiology and pharmacology. And until they do that they're just not going to come up with the goods, basically.

#### [8]. ***IN VIVO* RECORDING - SONOMICROMETRY**

So my training you know really in *in vivo* physiology and working with animal models, cardiovascular, you know recording anything cardiovascular we could, cannulating anything we could. And I would say, you know, really although you'd think of it as a contemporary thing if you start tracing back in the literature, oh my gosh, this stuff was done like 100 years ago if you start looking back far enough. And a lot of the stuff you think you're actually doing for the first time has actually been done a long time ago. So well worth, you know, any area you get into, start looking back into it and see historically what was done before. One of the things that, we did, we got involved in looking at bladder, urinary bladder, and one of the things we found very interesting was that in fact the urinary bladder tends to move a lot. It's not just sort of sitting there all the time and filling up with urine. The whole time your bladder is kinda there, it's moving around, I don't know quite why, sensing things, who knows? Probably actually keeping the smooth muscle in good tone, even. And one of the ways we actually investigated this, it was a very neat little technique called "sonomicrometry". Now what sonomicrometry actually involves is, has little piezoelectric crystals, and they're dinky little things. They're called crystals, they're only about maybe one millimetre in size and what you can do, they're connected to, you know, a computer and a recording unit, is the little crystals, they talk to each other. And so they tell each other how far apart they are from each other. And in fact what we used to do, we would take a bladder, which is a pretty good size in a guinea pig, and we would attach five of these little crystals onto the bladder, we'd superglue them on. Superglue is used surgically, it's no real problem.

So you just superglue these little five crystals on and then you can get them to talk various ways. So that one will talk to that one, that one will talk to that one, and that one will talk to that one. So you get about five or six different measurements. Of course now with the bladder moving all around you can now tell what's going further apart and what's getting closer together. And you get little patterns coming up. Very distinct patterns on the bladder just as they move up and down. And this technique has actually been used in gastroenterology looking at the stomach and originally I think the technique was actually developed for cardiovascular, the heart, to watch how the heart was beating. And it's a very sophisticated little technique but very straightforward but very useful. What it does, if you take a bladder, say, and you try to measure pressure, the bladder is moving but it's not always contracting, it's not contracting in, it's kinda moving, kinda bag of worms, fibrillation almost, and so the pressure isn't changing at all. But you're getting the movement. With the little crystals you're not seeing a lot of pressure change but you're seeing quite vast, marked movement with the little crystals showing up. And this is quite a powerful way of looking at the bladder and it certainly is useful I think in identifying compounds that are going to be very effective for urinary incontinence.

#### [9]. **A NEW CAREER: CREATIVE WRITING**

I've always been interested in writing, and I'll tell you why. Writing is something that you've got to do reasonably well and if you're a scientist you've got to do it even better. What I found actually when I was working and I was supervising people, I ended up spending about a third of my time actually correcting the grammar in written reports that I received from the people that were reporting to me. So I've always been interested in it. I don't know, it may go back to why I studied Latin and all that, puts rules on your grammar and all that. And so the writing has always been of interest to me. Scientific writing, you have to write clearly, you have to know how to write, you have to be able to convey your ideas or it's just, you know, lost. So I actually decided I would go into more kinda fictional writing and use my imagination a little bit if I could and, you know, managed to write a couple of short stories which won a couple of prizes and all that. And

then back in 2009 I mentioned to you, Tilly, that when I was 11-years-old I was in this aeroplane crash and I decided that in fact what I would do, kinda more for the family than anything else, I would go back and actually document and talk to the people who were there on the night of the aeroplane crash, who actually pulled my sister and I out of the aeroplane. And then I put it in a book, I can even send you a copy, if you'd like and it was published in 2012. So that was a very interesting thing to do, you know, kinda investigative reporting. What I decided to do was, my sister and I actually had not been back to this little town for 50 years, and so I got back in touch with these people, it was up in Northern Wisconsin, and I got in touch with the people back in this little town and said, 'Look, do you remember this?' All I got back was, 'I remember it like it was yesterday.' And they were still around. They're all in their 80s, you know. So my sister and I went back up there and we met them all and you know we met the people who actually pulled us out of the plane, you know, still remember getting us to the hospital, taking all the pictures. My sister was very severely injured, you know, never thought she was going to walk again, her legs were so badly hurt. And the lady, we talked to the lady who took all the X-ray pictures of her legs and everything. And you know so I thought, 'Look, I've got to write this book as a way of sort of thanking the town for all the things these people did all those years back.' And so that's when I really started getting into writing, you know, because I didn't want the book just to 'oh, this happened and this happened then and then this happened then' so I tried to go back to talk to all the people. I interviewed loads of people and quite luckily I got a hold of one guy who lived up there who was a professional pilot, a captain for United Airlines, and an accident investigator. And he kinda collaborated with me so it gave me really good background for 'Why did the accident happen', you know? How did this happen? What built up to it? And this is what I was trying to bring out in the book. I started out, you know, kinda a couple of weeks before the accident and a cousin came to stay with us and all that. Sort of built into it from there. But that's where a big part of the writing came from and I figured, 'I'll do a novel too.' So I'm into my novel at the moment.

#### [10]. THOUGHTS ON THE FUTURE OF THE PHARMACEUTICAL INDUSTRY

Well, I think probably what you're going to see is you are going to be seeing back to the fundamentals, back to the basics, back to the understanding in physiology and pharmacology. I can't see how things will move forward. There will just be too much money lost in this again if there is. The way I think this is going to happen is possibly through more independent and smaller companies. As far as coming up with the goods on the diseases, they're going about it the right way. You're starting to get, you know, down to the biochemistry, the molecular level, what's happening this way, what's happening that. The problem there is you're going to have to be real careful because it's something that previously what you have is a situation where people will look at a disease area and they will find a marker. And we saw this years and years ago in the British Society of Gastroenterology and what you could see is you get all sorts of presentations at these meetings. We were interested in irritable bowel syndrome at the time and you would get the clinicians come up and they would present stuff and they'd say, 'Well, look, we have this patient population of irritable bowel syndromers. And in fact the compound, you know the endogenous compound *blab, blab, blab* is raised. Therefore that is what causes irritable bowel syndrome.' And what they were doing, of course they were doing, they were getting correlation, correlations saying such-and-such is raised and therefore it must be the cause. They were confusing correlation with causation. So what we've got to do is get away from the correlation and down to the causation and that is not going to be a trivial thing to do.

[END OF TRANSCRIPT]

#### Further related resources:

1. Christie D A, Tansey E M. (eds) (2007) *The discovery, use and impact of platinum salts as chemotherapy agents for cancer*. Wellcome Witnesses to Twentieth Century Medicine, vol. 30. London: The Wellcome Trust Centre for the History of Medicine at UCL.
2. Miner W D, Sanger G J (1986) Inhibition of cisplatin-induced vomiting by selective 5-hydroxytryptamine M-receptor antagonism. *British Journal of Pharmacology* **88**: 497-499.
3. Miner W D (2012) *From Chicago North into Peril*. Wisconsin: Worzalla Publishing.

4. Overy C, Tansey E M (eds) (2013) *Drugs Affecting 5-HT Systems*. Wellcome Witnesses to Contemporary Medicine, vol. 47. London: Queen Mary, University of London.
5. Tansey E M (intr); Tansey E M, Wilkinson A (eds) (2016) *Miner, Wesley: transcript of an audio interview (15-Jul-2016)*. History of Modern Biomedicine Interviews (Digital Collection), item e2016094. London: Queen Mary University of London.